

REMARKS

Claims 1, 4, 5, 10-12, 14, and 15 are all the claims pending in the application.

Claim 1 is amended to include the recitations of dependent claim 3, acknowledged to be distinct from both Hatano and Kawai in the Office Action of June 5, 2002, page 4. No new matter is added.

Initially, it is noted in the Office Action that Figure 5 should be designated as "Prior Art" because only a conventional structure is illustrated. In response, Applicants provide corrected drawing sheets, with Figure 5 labeled "Prior Art."

Claims 6-9 are rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains to make or use the invention. Claims 6-9 are cancelled.

Claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hatano (U.S. Patent 5,042,043) in view of Kawai (JP 411045892A). Hatano is asserted to disclose a group III nitride semiconductor light-emitting device comprising a substrate 11 (column 4, lines 25-27) having thereon a light-emitting structure comprising a gallium nitride phosphide single crystal layer 15 (column 4, lines 28-30) provided via a boron phosphide-based buffer layer 13 (column 4, line 33).

It is acknowledged in the Office Action that Hatano does not teach that the substrate is a single crystal. Kawai is therefore relied upon for disclosing the use of a single-crystal substrate in semiconductor light-emitting devices (see English abstract, "Problem to be Solved") for enhancing hardness and stability.

Claims 2-3 and 5 are rejected as obvious over the same references, in further view of Thorton. However, the buffer layer in amended claim 1 differs from Thorton. The boron phosphide-based buffer layer of the present invention comprises a multilayer structure including an amorphous layer and a crystalline layer. Both the amorphous and crystalline layers are composed of the same boron phosphide-based material.

Thorton, by contrast, discloses that the amorphous buffer layer 20 is made of aluminum oxide and the second single crystal layer 14 is made of GaAs. See column 6, lines 11-22 of Thorton. Thus, the amorphous layer and the crystalline layer are different materials. This is different from the present invention, which is achieved by manipulating the crystal growth temperature. Thus, Thorton does not teach or suggest the semiconductor LED of the present claims.

Responsive to the rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Hatano et al and Kawai, further in view of U.S. Patent 5,612,551 to Liu et al, Applicant relies on the above response with respect to the rejection of claim 1 over Hatano in view of Kawai. Liu et al adds nothing of consequence which would adversely affect patentability of the amended claims.

Applicant likewise relies on patentability of amended claim 1 with respect to the rejection of claim 6, 9-10 and 13 under 35 U.S.C. § 103(a) over Hatano et al and Kawai, further in view of U.S. Patent 5,326,424 to Doll.

With regard to the rejection of claim 7 under 35 U.S.C. § 103(a), claim 7 has been canceled rendering the rejection moot. Likewise with claim 8.

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Applicant further relies on patentability of amended claim 1 with respect to the various rejections of claim 11, claim 12 and claims 14 and 15 over prior art. There is nothing in Doll et al or U.S. Patent 6,121,637 to Isokawa et al which would adversely affect patentability of the amended claims.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 2, 3, 6-9, and 13 are canceled.

The claims are amended as follows:

1. (Amended) A group-III nitride semiconductor light-emitting device comprising a single crystal substrate having thereon a light-emitting part structure comprising a gallium nitride phosphide ($\text{GaN}_{1-X}\text{P}_X$, wherein $0 < X < 1$) single crystal layer provided via a boron phosphide (BP)-based buffer layer, wherein the boron phosphide-based buffer layer comprises a multilayer structure including an amorphous layer and a crystalline layer formed on the amorphous layer, both the amorphous layer and the crystalline layer being made of the same material.